SPEC CPU®2017 Integer Rate Result

Fujitsu
PRIMERGY RX4770 M7, Intel Xeon Platinum 8444H, 2.90GHz

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Fujitsu
2.90GHz
PRIMERGY RX4770 M7, Intel Xeon Platinum 8444H,

SPECrate®2017_int_base = 649

SPECrate®2017_int_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Jun-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022

Hardware
CPU Name: Intel Xeon Platinum 8444H
Max MHz: 4000
Nominal: 2900
Enabled: 64 cores, 4 chips, 2 threads/core
Orderable: 2.4 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 45 MB I+D on chip per chip
Other: None
Memory: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.92 TB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 15 SP4
5.14.21-150400.22-default
Compiler: C/C++, Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Fujitsu BIOS Version V1.0.0.0 R1.10.0 for D3984-A1x. Released Jun-2023
tested as V1.0.0.0 R1.2.0 for D3984-A1x May-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Base Copies</th>
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<td>417</td>
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<td>557.xz_r</td>
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<td>295</td>
<td>469</td>
<td>295</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH = "/home/Benchmark/speccpu/lib/intel64:/home/Benchmark/speccpu/lib/ia32:/home/Benchmark/speccpu/je5.0.1-32"

MALLOC_CONF = "retain:true"
General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
Transparent Huge Pages enabled by default
Filesystem page cache synced and cleared with:
    sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
    numactl --interleave=all runcpu <etc>
NR: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.

Platform Notes

BIOS configuration:
DCU Streamer Prefetcher = Disabled
Package C State limit = C0
LLC Dead Line Alloc = Disabled
CPU Performance Boost = Aggressive
SNC (Sub NUMA) = Enable SNC4
FAN Control = Full
Sysinfo program /home/Benchmark/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Thu Jun  1 03:37:34 2023

SUT (System Under Test) info as seen by some common utilities.

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2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lsocpu
8. numactl --hardware
9. /proc/meminfo
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12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS
-----------------------------------------------------------------

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**Test Date:** Jun-2023  
**Hardware Availability:** Jun-2023  
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**Platform Notes (Continued)**

1. **uname -a**
   
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)  
   x86_64 x86_64 x86_64 GNU/Linux

2. **w**
   
   03:37:34 up 1 min, 1 user, load average: 3.68, 2.27, 0.89
   
   USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
   root tty1 - 03:37 14.00s 2.63s 0.38s /home/Benchmark/ptu-unified/ptu -i 5000000
   -filter 0x3f -ts -csv -log -logdir . -logname ptu_intrate_SPR_2017_withptu_202306010337

3. **Username**
   
   From environment variable $USER: root

4. **ulimit -a**
   
   core file size (blocks, -c) unlimited
   data seg size (kbytes, -d) unlimited
   scheduling priority (-e) 0
   file size (blocks, -f) unlimited
   pending signals (-i) 8253992
   max locked memory (kbytes, -l) 64
   max memory size (kbytes, -m) unlimited
   open files (-n) 1024
   pipe size (512 bytes, -p) 8
   POSIX message queues (bytes, -q) 819200
   real-time priority (-r) 0
   stack size (kbytes, -s) unlimited
   cpu time (seconds, -t) unlimited
   max user processes (-u) 8253992
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

5. **sysinfo process ancestry**
   
   /usr/lib/systemd/systemd --switched-root --system --deserialized 30
   login -- root
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base --o all intrate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=128 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
   rate --tune base --size refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/Benchmark/speccpu

6. **/proc/cpuinfo**
   
   model name : Intel(R) Xeon(R) Platinum 8444H
   vendor_id : GenuineIntel
   cpu family : 6
   model : 143
   stepping : 8
   microcode : 0x2b0001b0

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Test Date: Jun-2023
Hardware Availability: Jun-2023
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Platform Notes (Continued)

bugs            : spectre_v1 spectre_v2 spec_store_bypass swaps
cpu cores       : 16
siblings        : 32
4 physical ids (chips)
128 processors (hardware threads)
physical id 0: core ids 0-15
physical id 1: core ids 0-15
physical id 2: core ids 0-15
physical id 3: core ids 0-15
physical id 0: apicids 0-31
physical id 1: apicids 128-159
physical id 2: apicids 256-287
physical id 3: apicids 384-415
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.37.2:
Architecture:                     x86_64
CPU op-mode(s):                   32-bit, 64-bit
Address sizes:                   46 bits physical, 57 bits virtual
Byte Order:                      Little Endian
CPU(s):                          128
On-line CPU(s) list:             0-127
Vendor ID:                       GenuineIntel
Model name:                      Intel(R) Xeon(R) Platinum 8444H
CPU family:                      6
Model:                           143
Thread(s) per core:              2
Core(s) per socket:              16
Socket(s):                       4
Stepping:                        8
CPU max MHz:                     4000.0000
CPU min MHz:                     800.0000
BogoMIPS:                        5800.00
Flags:
fpu vme de pse tsc msr pae mce cmov pat pse36
    clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
    lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 kdreinit
    monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca
    sse4_1 x2apic movrp popcnt tsck deadlock timer aes xsave avx f16c rdrand
    lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cat_12 cdp_l3
    invpcid_single intel_pni cpd_l2 ssbd mba ibrs ibpb ibrs_advanced
    tpr_shadow vnci flexpriority ept vpid_ad fsgsbase tsc_adjust bmi1 hle
    avx2 aemep bmi2 erms invpcid rtm cqm rt_l_a avx512f avx512dq rdseed adx
    smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw
    avx512vl xsaveopt xsavec xgetbv1 xsaveav cqm_llc cqm_occup_llc
    cqm_mbb_total cqm_mbb_local split_lock detect avx vnmi avx512_bf16
    avx512_vbmi dtherm ida arat pns pts hwp hwp_act_window hwp_epp
    hwp_kptlr ept ceo avx512vl bvb snis vaes avxpmulqdq avx512_vnni
    avx512_bitalg
    t ime avx512_vpopcntdq l1s7 rdpid bus_lock_detect cldemote movdiri
    movdir64b enqcmd fpm md clear serialize tlsxldtrk pconfia arch_lbr
    avx512_fp16
    amx_tile flush_l1d arch_capabilities

Virtualization:                  VT-x
L1d cache:                       3 MiB (64 instances)
L1i cache:                       2 MiB (64 instances)
L2 cache:                        128 MiB (64 instances)
L3 cache:                        180 MiB (4 instances)

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<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
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<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
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## Platform Notes (Continued)

| NUMA node(s): | 16 |
| NUMA node0 CPU(s): | 0-3, 64-67 |
| NUMA node1 CPU(s): | 4-7, 68-71 |
| NUMA node2 CPU(s): | 8-11, 72-75 |
| NUMA node3 CPU(s): | 12-15, 76-79 |
| NUMA node4 CPU(s): | 16-19, 80-83 |
| NUMA node5 CPU(s): | 20-23, 84-87 |
| NUMA node6 CPU(s): | 24-27, 88-91 |
| NUMA node7 CPU(s): | 28-31, 92-95 |
| NUMA node8 CPU(s): | 32-35, 96-99 |
| NUMA node9 CPU(s): | 36-39, 100-103 |
| NUMA node10 CPU(s): | 40-43, 104-107 |
| NUMA node11 CPU(s): | 44-47, 108-111 |
| NUMA node12 CPU(s): | 48-51, 112-115 |
| NUMA node13 CPU(s): | 52-55, 116-119 |
| NUMA node14 CPU(s): | 56-59, 120-123 |
| NUMA node15 CPU(s): | 60-63, 124-127 |

- **Vulnerability Itlb multihit:** Not affected  
- **Vulnerability Ltlf:** Not affected  
- **Vulnerability Mds:** Not affected  
- **Vulnerability Meltdown:** Not affected  
- **Vulnerability Spec store bypass:** Mitigation; Speculative Store Bypass disabled via prctl and seccomp  
- **Vulnerability Spectre v1:** Mitigation; usercopy/swapgs barriers and __user pointer sanitization  
- **Vulnerability Spectre v2:** Mitigation; Enhanced IBRS, IBPB conditional, RSB filling  
- **Vulnerability Srbds:** Not affected  
- **Vulnerability Tsx async abort:** Not affected

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
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<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>3M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>2M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>128M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>45M</td>
<td>180M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>49152</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

--------------------------------------------------------------------------------------------------------------------------

8. numactl --hardware  
**NOTE:** a numactl 'node' might or might not correspond to a physical chip.

available: 16 nodes (0-15)  
node 0 cpus: 0-3, 64-67  
node 0 size: 128600 MB  
node 0 free: 127948 MB  
node 1 cpus: 4-7, 68-71  
node 1 size: 129021 MB  
node 1 free: 128752 MB  
node 2 cpus: 8-11, 72-75  
node 2 size: 129021 MB  
node 2 free: 128787 MB  
node 3 cpus: 12-15, 76-79  
node 3 size: 129021 MB  
node 3 free: 128853 MB  
node 4 cpus: 16-19, 80-83  
node 4 size: 129021 MB  
node 4 free: 128792 MB  
node 5 cpus: 20-23, 84-87  
node 5 size: 129021 MB  
node 5 free: 128832 MB  
node 6 cpus: 24-27, 88-91  
node 6 size: 129021 MB  
node 6 free: 128827 MB  
node 7 cpus: 28-31, 92-95  

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Platform Notes (Continued)

node 7 size: 128987 MB
node 7 free: 128778 MB
node 8 cpus: 32-35, 96-99
node 8 size: 129021 MB
node 8 free: 128882 MB
node 9 cpus: 36-39, 100-103
node 9 size: 129021 MB
node 9 free: 128879 MB
node 10 cpus: 40-43, 104-107
node 10 size: 129021 MB
node 10 free: 128906 MB
node 11 cpus: 44-47, 116-119
node 11 size: 129021 MB
node 11 free: 128872 MB
node 12 cpus: 48-51, 112-115
node 12 size: 129021 MB
node 12 free: 128927 MB
node 13 cpus: 52-55, 124-127
node 13 size: 129021 MB
node 13 free: 128650 MB
node 15 free: 128532 MB
node distances:

node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
0:  10  12  12  12  12  12  12  12  12  12  12  12  12  12  12  12
1:  12  10  12  12  12  12  12  12  12  12  12  12  12  12  12  12
2:  12  12  10  12  12  12  12  12  12  12  12  12  12  12  12  12
3:  12  12  10  12  12  12  12  12  12  12  12  12  12  12  12  12
4:  21  21  21  21  10  12  12  12  21  21  21  21  21  21  21  21
5:  21  21  21  21  12  10  12  12  21  21  21  21  21  21  21  21
6:  21  21  21  21  12  12  10  12  21  21  21  21  21  21  21  21
7:  21  21  21  21  12  12  12  10  21  21  21  21  21  21  21  21
8:  21  21  21  21  21  21  21  21  10  12  12  12  21  21  21  21
9:  21  21  21  21  21  21  21  21  12  10  12  12  21  21  21  21
10: 21  21  21  21  21  21  21  21  12  10  12  12  21  21  21  21
11: 21  21  21  21  21  21  21  21  12  10  12  12  21  21  21  21
12: 21  21  21  21  21  21  21  21  10  12  12  12  21  21  21  21
13: 21  21  21  21  21  21  21  21  21  12  10  12  12  21  21  21
14: 21  21  21  21  21  21  21  21  21  12  10  12  12  21  21  21
15: 21  21  21  21  21  21  21  21  21  12  10  12  12  21  21  21

9. /proc/meminfo
MemTotal: 2113046856 kB

10. who -r
   run-level 3 Jun 1 03:36

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
   Default Target Status
   multi-user degraded

12. Failed units, from systemctl list-units --state=failed

(Continued on next page)
Platform Notes (Continued)

UNIT LOAD ACTIVE SUB DESCRIPTION
* sep5.service loaded failed failed failed systemd script to load sep5 driver at boot time

13. Services, from systemctl list-unit-files

<table>
<thead>
<tr>
<th>STATE</th>
<th>UNIT FILES</th>
</tr>
</thead>
</table>
| enabled | YaST2-Firstboot YaST2-Second-Stage apparmor auditing bluetooth cron display-manager getty
hovedeg irbalance iscsi issue-generator kbdsettings kdump kdump-early klog lvm2-monitor
ncsd postfix purge-kernels rollback rsyslog sep5 smartd sshd wicked wicked-auto4
wicked-dhcp4 wicked-dhcp6 wickedd-nanny
| enabled-runtime | systemd-remount-fs |
| disabled | accounts-daemon appstream-sync-cache autos lifecycle-initscripts blk-availability
blueetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
cups-browsed debug-shell etables exchange-bmc-os-info firewall gpm grub2-once
havedeg-switch-root ipmil ipmi_evtlog iscsi-init iscsi-nio iscsiuiio issue-addr-ssh-keys kexec-load
<table>
<thead>
<tr>
<th>indirect</th>
<th>wicked</th>
</tr>
</thead>
</table>

14. Linux kernel boot-time arguments, from /proc/cmdline

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=9e2670af-d584-4578-97c8-36df0cf0c1166
splash=silent
mitigations=auto
quiet
security=apparmor
crashkernel=324M,high
| indirect | wicked |

15. cpupower frequency-info

analyzing CPU 0:
current policy: frequency should be within 800 MHz and 4.00 GHz.
The governor "powersave" may decide which speed to use
within this range.
boost state support:
| Supported: yes |
| Active: yes |

16. sysctl

| kernel.numa_balancing | 1 |
| kernel.randomize_va_space | 2 |
| vm.compaction_proactiveness | 20 |
| vm.dirty_background_bytes | 0 |
| vm.dirty_background_ratio | 10 |
| vm.dirty_bytes | 0 |
| vm.dirty_expire_centisecs | 3000 |
| vm.dirty_ratio | 20 |
| vm.dirty_writeback_centisecs | 500 |
| vm.dirtytime_expire_seconds | 43200 |
| vm.extrfrag_threshold | 500 |
| vm.min_unmapped_ratio | 1 |
| vm.nr_hugepages | 0 |
| vm.nr_hugepages_mempolicy | 0 |
| vm.nr_overcommit_hugepages | 0 |
| vm.swappiness | 60 |

(Continued on next page)
Fujitsu
PRIMERGY RX4770 M7, Intel Xeon Platinum 8444H, 2.90GHz

SPEC Rate® 2017 int_base = 649
SPEC Rate® 2017 int_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Platform Notes (Continued)

- `vm.watermark_boost_factor`: 15000
- `vm.watermark_scale_factor`: 10
- `vm.zone_reclaim_mode`: 0

---

17. `/sys/kernel/mm/transparent_hugepage`
   
   defrag: always defer defer+madvise [madvise] never
   enabled: [always] madvise never
   hpage_pmd_size: 2097152
   shmem_enabled: always within_size advise [never] deny force

---

18. `/sys/kernel/mm/transparent_hugepage/klhugepaged`
   
   alloc_sleep_microseconds: 60000
   defrag: 1
   max_ptes_none: 511
   max_ptes_shared: 256
   max_ptes_swap: 64
   pages_to_scan: 4096
   scan_sleep_microseconds: 10000

---

19. OS release
   
   From `/etc/*-release /etc/*-version`
   `os-release SUSE Linux Enterprise Server 15 SP4`

---

20. Disk information
   
   SPEC is set to: `/home/Benchmark/speccpu`
   
   Filesystem  Type       Size  Used  Avail Use% Mounted on
   /dev/sda2    xfs        1.8T   79G  1.7T   5% /

---

21. `/sys/devices/virtual/dmi/id`
   
   Vendor: FUJITSU
   Product: PRIMERGY RX4770 M7
   Product Family: SERVER
   Serial: EWCDXXXXXX

---

22. dmidecode
   
   Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

   Memory:
   
   13x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800
   4x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800
   15x Samsung M321R8GA0BB0-CQKV0 64 GB 2 rank 4800

---

23. BIOS
   
   (This section combines info from `/sys/devices and dmidecode.)

   BIOS Vendor: FUJITSU
   BIOS Version: V1.0.0.0 R1.2.0 for D3984-A1x
   BIOS Date: 05/12/2023
   BIOS Revision: 1.2
   Firmware Revision: 2.25
Compiler Version Notes

C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
-----------------------------------------------------------------------------------------------
 Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
 Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------------------

C++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
-----------------------------------------------------------------------------------------------
 Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
 Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------------------

Fortran | 548.exchange2_r(base)
-----------------------------------------------------------------------------------------------
 Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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-----------------------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64  -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64  -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
**SPEC CPU®2017 Integer Rate Result**

**Fujitsu**

PRIMERGY RX4770 M7, Intel Xeon Platinum 8444H, 2.90GHz

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>649</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 19  
**Test Sponsor:** Fujitsu  
**Tested by:** Fujitsu  
**Test Date:** Jun-2023  
**Hardware Availability:** Jun-2023  
**Software Availability:** Dec-2022

### Base Optimization Flags

**C benchmarks:**
- `-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

**C++ benchmarks:**
- `-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

**Fortran benchmarks:**
- `-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs -align array32byte -auto`
- `-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

The flags files that were used to format this result can be browsed at

- [http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html](http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html)

You can also download the XML flags sources by saving the following links:

- [http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml](http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml)

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